

7-7 Operations on Functions

$$f(x) = 3x^2 + 7x$$

$$g(x) = 2x^2 - x - 1$$

$$f(-1) = 3(-1)^2 + 7(-1) = -4$$

$$g(-1) = 2(-1)^2 - (-1) - 1 \\ = 2$$

$$f(x) = 3x^2 + 7x$$

$$g(x) = 2x^2 - x - 1$$

$$\text{SUM} \quad (f + g)x = f(x) + g(x)$$

$$(f + g)x = 3x^2 + 7x + 2x^2 - x - 1 \\ 5x^2 + 6x - 1$$

$$f(x) = 3x^2 + 7x$$

$$g(x) = 2x^2 - x - 1$$

$$\text{Difference} \quad (f - g)x = f(x) - g(x)$$

$$(f - g)x = 3x^2 + 7x - (2x^2 - x - 1) \\ x^2 + 8x + 1$$

$$f(x) = 3x^2 + 7x$$

$$g(x) = 2x^2 - x - 1$$

$$\text{Product} \quad (f \cdot g)x = f(x) \cdot g(x)$$

$$(f \cdot g)x = (3x^2 + 7x)(2x^2 - x - 1) \\ 6x^4 + 11x^3 - 10x^2 - 7x$$

$$f(x) = 3x^2 + 7x$$

$$g(x) = 2x^2 - x - 1$$

Quotient $\left(\frac{f}{g}\right)x = f(x) \div g(x)$

$$\left(\frac{f}{g}\right)x = \frac{3x^2 + 7x}{2x^2 - x - 1} = \frac{x(3x+7)}{(2x+1)(x-1)}$$

$g(x) \neq 0$

$x \neq -\frac{1}{2} \quad x \neq 1$

Composition of Functions

$$f(x) = 3x^2 - 2x + 1$$

$$g(x) = x - 4$$

$$[f \circ g](x) = f[g(x)]$$

$$[g \circ f](x) = g[f(x)]$$

Composition of Functions

$$f(x) = 3x^2 - 2x + 1$$

$$g(x) = x - 4$$

$$[f \circ g](3) =$$

$$f(-1) = \boxed{6}$$

$$f[g(3)]$$

Composition of Functions

$$f(x) = 3x^2 - 2x + 1$$

$$g(x) = x - 4$$

$$[f \circ g](7) =$$

$$f(3) = \boxed{22}$$

Composition of Functions

$$f(x) = 3x^2 - 2x + 1$$

$$g(x) = x - 4$$

$$[g \circ f](3) =$$

$$g(22) = 18$$

Composition of Functions

$$f(x) = 3x^2 - 2x + 1$$

$$g(x) = x - 4$$

$$g[f(2)] =$$

Composition of Functions

$$f(x) = 3x^2 - 2x + 1$$

$$g(x) = x - 4$$

$$[f \circ g](x) = f[g(x)]$$

$$\begin{aligned} & f(x-4) \\ & 3(x-4)^2 - 2(x-4) + 1 \\ & 3x^2 - 26x + 57 \end{aligned}$$

Composition of Functions

$$f(x) = 3x^2 - 2x + 1$$

$$g(x) = x - 4$$

$$[g \circ f](x) = g[f(x)]$$

$$\begin{aligned} & g(3x^2 - 2x + 1) \\ & = 3x^2 - 2x + 1 - 4 \\ & = 3x^2 - 2x - 3 \end{aligned}$$

Sets

$$f = \{(2,6) (9,4) (7,7) (0, -1)\}$$

$$g = \{(\underline{7},0) (\underline{-1},7) (\underline{4},9) (8,2)\}$$

$$f \circ g = \{(7,-1), (-1,7) (4,4) (8,6)\}$$

Sets

$$f = \{(\underline{2},6) (9,4) (7,7) (0, -1)\}$$

$$g = \{(7,0) (-1,7) (4,9) (8,2)\}$$

$$g \circ f = \{(9,9) (7,0) (0,7)\}$$

DO:

$$f = \{(8,9) (6,4) (10,9) (12,6)\}$$

$$g = \{(6,8) (4,6) (8,9) (9,12)\}$$

$$f \circ g = \{(6,9) (4,4) (9,6)\}$$

$$g \circ f = \{(8,12) (6,6) (10,12) (12,8)\}$$

Hw

p387-388

17, 20, 23-31 odd

35, 41, 45